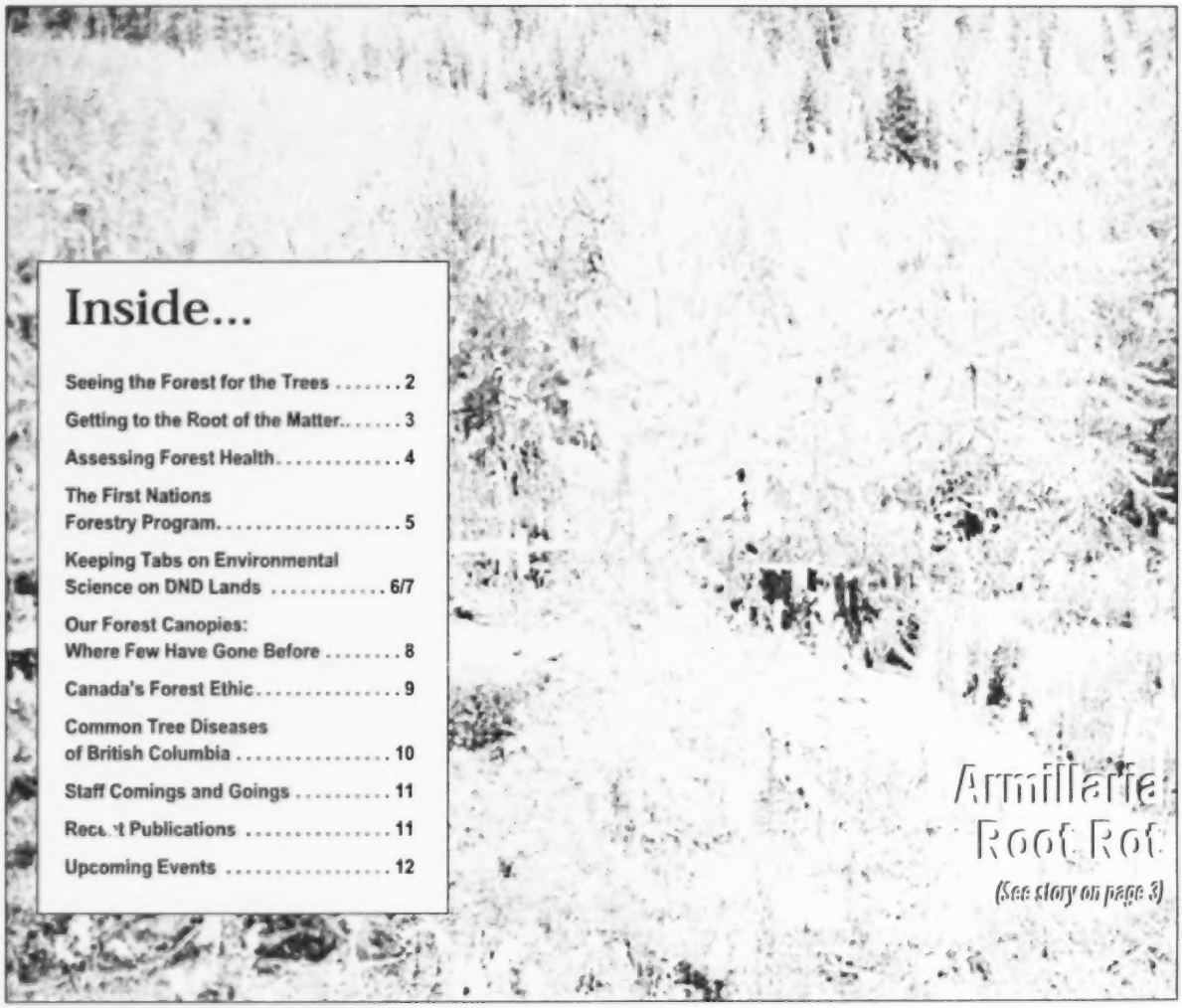
ISSN 0706-9413

December 1996

INFORMATION FORESTRY

Pacific Forestry Centre

Victoria, British Columbia



Inside...

Seeing the Forest for the Trees 2

Getting to the Root of the Matter..... 3

Assessing Forest Health..... 4

The First Nations Forestry Program..... 5

Keeping Tabs on Environmental Science on DND Lands 6/7

Our Forest Canopies: Where Few Have Gone Before 8

Canada's Forest Ethic..... 9

Common Tree Diseases of British Columbia 10

Staff Comings and Goings 11

Recent Publications 11

Upcoming Events 12

Armillaria Root Rot

(See story on page 3)

Natural Resources Canada
Canadian Forest Service

Ressources naturelles Canada
Service canadien des forêts

Canada

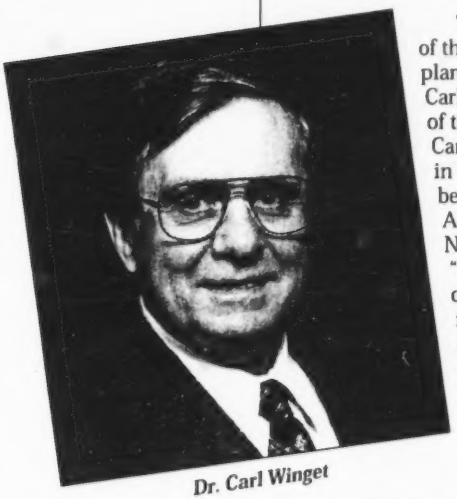
2007-03416/

Seeing the Forest for the Trees...

"There is a world-wide need to understand the variety of approaches to sustaining forest diversity."

and the animals and the people and the insects and the plants and the soil and the water.... . The complex ecosystem of the forest was the topic of an international conference called "Sustaining Ecosystems and People in Temperate and Boreal Forests" held in September in Victoria, B.C.

Jointly funded by the Canadian Forest Service, Forest Renewal B.C., the Association of Professional Biologists of B.C. and the Association of B.C. Professional Foresters, the conference was attended by individuals from around the world. They were there to discuss a universal challenge: how to sustain ecosystems and biological diversity despite the expected human population growth and economic development of the 21st century.



Dr. Carl Winget

"Approximately 80 percent of the world's animals and plants are found in forests," Dr. Carl Winget, Director General of the Pacific Forestry Centre, Canadian Forest Service said in his welcoming speech on behalf of the Honourable Anne McLellan, Minister of Natural Resources Canada. "So conserving biological diversity requires careful integration with those global, social and economic goals which exert pressure on forests."

Forests are crucial to the earth's ecological equilibrium, supporting much of the world's biological diversity but also contributing to the economy of many nations. There is a world-wide need to understand the variety of approaches to sustaining forest diversity. Therefore, conference discussions included topics such as: "A Sustainable Land Use Plan for Biodiversity Conservation in Far East Russia and Northern China"; "Biodiversity and Forest Management: A Central Himalayan Case from India"; "Sustainable Management of Relictual Biota: Case Studies from South-Western Australia and South-Western Africa"; and "Russian Model Forest: Direction to Sustainability". Besides such discussions, the conference also provided informative poster displays and tours throughout Vancouver Island.

Canada's Commitment to Sustaining Ecosystems

It is fitting that Canada was the host of the international conference, as it has one-tenth of the world's forests and maintains 20 percent of the world's fresh water. The forest industry provides employment for 880,000 Canadians (one job out of every 15) and over 300 of the country's communities have an economy based almost entirely on forestry. Therefore, Canada has a vested interest in responsibly managing its forest and fresh water resources, not just for future generations of Canadians, but for the global community.

To meet this responsibility, Canada has been at the forefront of international efforts concerning sustainable forest management both at home and throughout the world. It was the first developed nation to sign the Convention on Biological Diversity at the Earth Summit in Rio de Janeiro and was one of the principal originators of the Forest Principles developed at the United Nations conference.

To address the global challenge of sustaining ecosystems, Canada has developed partnerships with the international community. For example, along with 11 other countries (Argentina, Australia, Chile, China, Japan, The Republic of Korea, Mexico, New Zealand, the Russian Federation, Uruguay and the United States), Canada has been a leader in developing criteria for the conservation and sustainable management of temperate and boreal forests. These criteria involve conserving biodiversity, maintaining the health and vitality of forests, and improving forestry-related socio-economic benefits for the longer term.

In keeping with these efforts, Canada has developed a Canadian Biodiversity Strategy that, as Dr. Winget explained, boasts a holistic approach to forest conservation and sustainable management issues. "By 'holistic', I mean that both of these strategies rely on partnerships between federal and provincial governments, and with a wide variety of private-sector stakeholders: from owners of woodlots to integrated forest products companies."

Continued on page 12

Getting to the Root of the Matter

"This root rot can be a major threat to the productivity of the whole forest."

"Cure the disease and kill the patient." Francis Bacon's famous words unfortunately depict the way in which foresters must deal with Armillaria root rot: remove the infected tree to get rid of the disease.

"Once a tree is infected with *Armillaria ostoyae*, the only remedy is to remove the tree completely, including the stump and roots," explained Dr. Duncan Morrison, Canadian Forest Service (CFS) forest pathologist in the Effects of Forestry Practices Network. "Unfortunately, one infected tree usually means many infected trees. In some areas of Canada, this root rot can be a major threat to the productivity of the whole forest."

There are seven species of Armillaria root disease in western Canada, and six of them are found in B.C. In southern B.C. and the northwestern U.S., *Armillaria ostoyae* presents a major problem to forest managers. "In production forests of B.C., Armillaria root disease is the cause of annual forest losses estimated at about a million cubic metres," said Morrison, who works at the Pacific Forestry Centre. "The CFS works closely with foresters within the B.C. Ministry of Forests and the forest industry of southern B.C. to develop effective means of dealing with what is a serious disease of the forest in this province."

Effective treatment is drastic. Armillaria root rot spreads from tree to tree through root contact, so besides cutting the infected tree down, the stump also needs to be removed. "Usually, by the time you recognize that a tree has been infected by Armillaria root rot, it's too late," explained Morrison. "Because it is a disease of the roots, a certain amount of damage occurs below ground before that damage is expressed above ground. The first symptom is reduced growth in the crown. As the disease progresses, foliage becomes thinner and yellow."

How does the disease spread and how can it be controlled?

Root disease fungi are natural components of many ecosystems. But forest management practices that create stumps may upset the host-fungus equilibrium in favour of the fungus. What is a natural part of the forest now becomes a threat to the forest.

Armillaria root disease is carried from one rotation to the next in the stump and roots of harvested trees. Stump removal or push-falling of diseased trees by an excavator eliminates most of the fungus inoculum and reduces the amount of root disease in the new forest stand. But soil and topographic constraints often limit stump removal, so other strategies to reduce losses following harvest of disease stands are being evaluated in operational and research trials.

By planting species of trees that are less susceptible or immune to Armillaria root rot (for example, larch is proving to be resistant to *Armillaria ostoyae*), the disease is restricted to the affected tree. The disease can also be inhibited by reducing root contact through mixing trees that have horizontal rooting systems with those of vertical rooting systems. Another means of controlling Armillaria root rot is to plant a mixed conifer/hardwood stand. Species of hardwood trees are resistant to Armillaria root rot when they are young, while conifers become more resistant to the disease as they age.

The goal of root disease management is to regenerate harvested areas, improve timber production and reduce losses to root disease during the rotation. Inoculum reduction by removing the stump and roots has proven to be the best way to ensure these goals are met.

For more information on Armillaria root rot, please contact Dr. Duncan Morrison at dmorrison@pfc.forestry.ca.

To remedy Armillaria root rot, the tree stump and roots must be removed.

Assessing Forest Health

"We are looking at the global picture of what is happening to the forests of Canada."

The Canadian Forest Service (CFS) Forest Health Network is breaking new ground internationally by taking on the challenge of defining forest health and reporting on the state of this nation's forests.

"We are looking at the global picture of what is happening to the forests of Canada," Forest Health Network head Dr. Tom Sterner, of the Atlantic Forestry Centre, says. "We have never attempted this before."

Nor has any other nation. Other countries are able to report on yields, infestation, growth rates and the like, just as Canada currently does, but the CFS is the first to seek to define in entirety what a healthy forest is. Undertaking that denotation is network member Dr. Eric Allen of the Pacific Forestry Centre whose task it is to define "forest health" and determine ways of measuring it.

"Right now it's almost impossible to define, because it requires a definition of objectives first," Allen says. "A healthy forest to a forest company is different from a healthy forest to an environmental group or a national park."

So a definition has to look beyond simple tree health and encompass a multitude of values and ecological considerations.

Nick Humphreys collecting pinewood nematode samples on Vancouver Island.

"Our job is not easy," Allen confides. But with cooperation from other CFS networks, such as Landscape Management or Biodiversity, and in partnerships with industry and stakeholders, Sterner says the challenge can be surmounted one step at a time.

"We recognize this network does not have all the expertise, but many of those alliances are there and it is only a matter of reshaping them."

To start, the network will deal with those things it can currently handle. By 1997/98 the network expects to have completed the first national assessment of forest health in Canada. The establishment of a national picture of forest health will start with the more than 200 Acid Rain Network Early Warning System (ARNEWS) plots already in place across the country. With some expansion and retooling of research concentrations, the ARNEWS plots will become the basis for the network's national monitoring system. Success will mean Canada can demonstrate the health and sustainability of the nation's forests.

"We will be able to tell a more complete story," Sterner says. "Without this network we wouldn't appear to know about our own situation. The more information we have, the more we can explain or dispel misinformation."

The consequences of not doing so would threaten Canada's trade and environmental leadership role at the national and international level.

Forward from "FIDS"

For almost 50 years the Pacific Forestry Centre has been monitoring the condition of Canada's forests. Beginning with the first British Columbia Forest Insect Survey in 1949 and developing into the Forest Insect and Disease Survey (FIDS), the Pacific Forestry Centre of the CFS has played a role in helping track and improve the state of Canada's forests.

"FIDS was basically surveying B.C. forests for pests and disease, detecting them and assessing them," says Nick Humphreys, chief ranger with the Pacific Forestry Centre.

That also involved providing direction to industry and the province on pest and disease management. Now part of the Forest Health Network, FIDS is reducing that operational role and transferring it to the provinces who are responsible for management of the forest resource. "Though we will still be there as advisors to transfer technology that we have developed," Humphreys says.

Instead of operations, the Forest Health Network will look at the big picture of forest health and the state of Canada's forests.

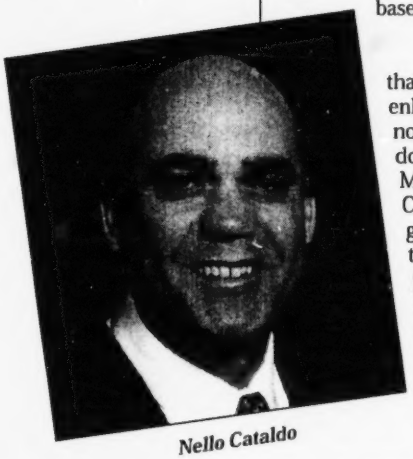
For more information, contact tsterner@fcmr.forestry.ca.

The First Nations Forestry Program

"The program was established...to enhance economic opportunities for First Nations."

In Canada, forestry is to the economy what trees are to the forest: essential to its existence. Although always connected to the forest, the First Nations community has not necessarily been directly involved in forestry. The **First Nations Forestry Program** encourages First Nations throughout Canada to participate in forest economic development.

Jointly funded by the Canadian Forest Service (CFS) and the Department of Indian Affairs and Northern Development (DIAND), the First Nations Forestry Program was established in March 1996 to enhance economic opportunities for First Nations both on and off reserves. The program provides financial and technical assistance to First Nations to ensure that they have the tools and skills needed to operate and participate in forest-based businesses across the country.



Nello Cataldo

"Opportunities are created so that there is more stability and enhancement with respect to economic growth," said Nello Cataldo, Collaborative Forestry Program Manager at the Pacific Forestry Centre. "A major aim of the program is to encourage joint ventures with off-reserve business partners. The program supports activities that identify, encourage and develop partnership initiatives, negotiation, business and forest management skills."

The First Nations Forestry Program also funds skill development and training in operational forestry activities such as forest inventories, resource management plans, site preparation, planting and silviculture treatments. Eligible recipients of the program are duly elected Indian band councils and tribal councils representing Indian bands, First Nation organizations and any other First Nation group or company involved in improving economic conditions in status Indian communities who can contribute to the objectives of the Program.

In supporting financially viable forestry operations, the First Nations Forestry Program creates more jobs and increases forest based business and economic opportunities both on and off the reserve. Funding for the program is available for three years, with the possibility of a two year extension. By the end of the program First Nations will have developed necessary forest management skills to continue in viable long-term forestry businesses both on and off the reserve. With this goal of self-sufficiency, the First Nations Forestry Program gives First Nations considerable control over their forestry objectives.

A National Management Committee consisting of the CFS and DIAND provides overall management and direction of the program across the country, exploring funding opportunities (trust funds, venture funding, capital pools) and establishing cooperative arrangements with other federal departments.

Provincial or territorial management committees consist of individuals from CFS, DIAND and First Nations and are responsible for the implementation of the First Nations Forestry Program in their respective province or territory. Provincial governments and members of the forest industry who can contribute to the objectives of the program are also encouraged to participate on the provincial or territorial committees.

"The B.C. Management Committee has reviewed 139 project proposals and approved 34 for the 1996/97 fiscal year budget of $950,000.00," explained Cataldo. "Some of these projects involve conducting feasibility studies, developing joint ventures within the forest industry and providing training in silviculture, integrated small scale forestry, and forest business development."

By promoting First Nations involvement in forestry, The First Nations Forestry Program continues Canada's commitment to sustainable forest development and new models of forest management.

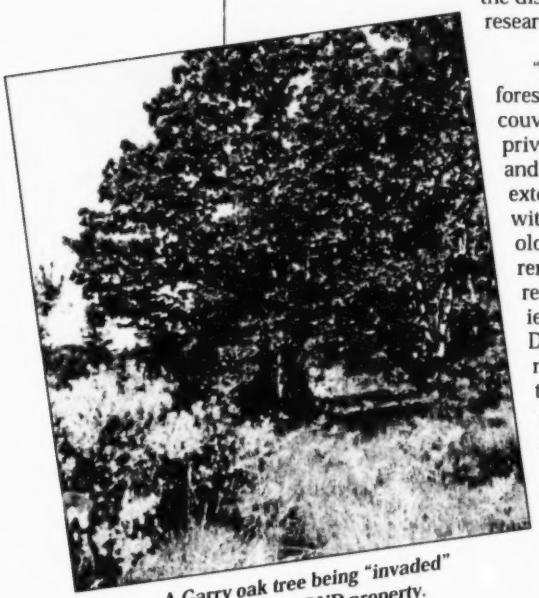
More information on the First Nations Forestry Program can be obtained by contacting ncataldo @pfc.forestry.ca.

Keeping Tabs on Environmental Science on DND Lands

"As attention on environmental issues continues to escalate, interest in conducting research on DND lands continues to grow."

What do endangered onions, purple martins, turkey vultures, and big-eared bats have in common with the Department of National Defence (DND)? More than you might think.

Such plants and animals are part of research projects being conducted on DND land. The projects are reviewed and tracked by The Department of National Defence Environmental Science Advisory Committee (ESAC) consisting of representatives from the Canadian Forest Service (CFS), DND, Canadian Wildlife Service, University of Victoria, Lester B. Pearson College of the Pacific, Royal Roads University, and the B.C. Ministry of Forests. The committee provides expertise, advice and supervision of such research on DND properties within B.C. and provides opportunities for the dissemination of research results.



A Garry oak tree being "invaded" by broom on DND property.

"Much of the forest on east Vancouver Island is privately owned and has been extensively logged with few areas of old-growth forest remaining for research studies," explained Dr. Tony Trofymow, chair of the Committee and research scientist at the Pacific Forestry Centre. "Old-growth forest areas on DND land provide excellent research opportunities. This fact, coupled with a need to protect these old-growth forest areas, helped create the impetus for establishing the DND Environmental Science Advisory Committee."

As attention on environmental issues continues to escalate, interest in conducting research on DND lands continues to grow. "In the past, there wasn't any tracking of research conducted on DND land," explains Arthur Robinson, Federal Lands Forester at the Pacific Forestry Centre. "No one really knew the extent of research that was going on. But it became obvious to the DND/CFS Forest Resource Management Committee that the increased interest in research meant that some way of tracking the information was necessary."

To facilitate the tracking of research proposals, ESAC was established. The committee coordinates the research through granting access to DND land based on a formal permit process. Research proposals are submitted to the committee which reviews and evaluates them. The committee recommends acceptable proposals to the DND/CFS Forest Resource Management Committee (that oversees forest management of the properties; please see detail below) and provides access permits for the research. This permitting system provides a means for reviewing and managing research. It is also the basis for collecting ongoing research and archiving research reports.

Preferred projects are those proposed by qualified researchers which contribute to the knowledge and understanding of the functioning of ecosystems and environmental management. All phases of proposed activities are evaluated for their potential effect on the ecosystem.

"The properties include a wide range of ecosystems, covering coastal as well as inland areas and unique environments such as the Queen Charlotte Islands," Robinson said. "Because the lands were used by DND for defence purposes such as training, they are relatively undisturbed and provide researchers with a unique opportunity. There are about 5000 hectares of DND land covering 19 properties across B.C and about half of that is being used for research."

Besides administering research programs, the committee co-sponsors workshops for researchers on DND land. Project members present results of their studies and communicate with other researchers working on DND property. Such workshops have included recommendations for the conservation of species.

The Environmental Science Advisory Board was established in 1993 under a five-year letter of understanding between DND (Maritime Forces Pacific Headquarters) and the Canadian Forest Service (Pacific Forestry Centre) and acknowledged by the other members of the Advisory Board. Of the 22 proposals received by the committee in 1995, 20 permits were issued.

The DND/CFS Forest Resource Management Program

The DND/CFS Forest Resource Management Program was initiated by DND and CFS in 1987 to manage a large percentage of DND land in B.C. A memorandum of understanding between the two departments established the DND/CFS Forest Resource Management Committee with a mandate to implement a forest resource management program for the sustainable development of forest resources on DND properties in B.C.

A long-term Forest Resource Management Plan was developed by the DND/CFS Forest Resource Management Committee. Subsequent annual Silviculture Operating Plans are prepared each year to carry out such forest practices as reforestation, harvesting, timber sales, wildlife preservation in old-growth areas, and site preparation, planting and other stand tending activities.

The DND/CFS Forest Resource Management Committee oversees the use of DND lands for environmental science research through the multiagency technical advisory subcommittee, ESAC. It is chaired by CFS and reports to the DND/CFS Forest Resource Management Committee.

For more information about the DND/CFS Forest Resource Management Program and the DND/CFS Environmental Science Advisory Committee, or to receive the ESAC 1995 annual report detailing the research, contact: arobinson@pfc.forestry.ca. A world wide web page on the subject is planned for the spring.

The Research Projects

Some of the research projects that are or have been conducted on DND land under the DND Environmental Science Advisory Committee:

- Physiological studies of the Pacific yew
- Bat inventory
- SI/MAB ecological monitoring plots
- Migration Monitoring of Neotropical Landbirds
- Bird surveys of old-growth forests
- Ecological assessment of forest land
- Sustainable development of natural sources of taxol
- Ecology and behaviour of insectivorous bats
- Forest canopy anthropod sampling
- Garry oak regeneration
- Garry oak acorn: production, dispersal, germination
- Migrating raptors
- Rare plant inventory
- Inventory/map small wetlands
- Detailed garry oak ecosystem mapping
- Rare butterfly inventory
- Inventory of rare invertebrates
- Demographics of *allium amplectens*
- Purple martin nestbox program
- Films on turkey vultures and bat habitat
- Sharp-tailed snake inventory
- Hawk habitat study
- Management of spruce weevil

Our Forest Canopies: Where Few Have Gone Before

"Current canopy studies aim to understand the structure of the canopy anthropod community."

The Canadian Forest Service (CFS) is literally climbing to new heights in the quest for knowledge of forest biodiversity. In collaboration with the University of Victoria, Forest Renewal B.C. and MacMillan Bloedel Ltd., the CFS is gathering new, important data about one of our last unexplored biotic frontiers: the old-growth forest canopy.

"We know very little about these canopies," explains Dr. Leland Humble, research scientist at the CFS' Pacific Forestry Centre (PFC). PFC's current canopy studies aim to understand the structure of the canopy arthropod community within the montane old-growth forest, and how it is affected by proposed alternative silviculture systems.

To this end, PFC's Insectary is currently extracting arthropods from canopy samples collected at the Montane Alternative Silviculture Systems (MASS) research site near Campbell River on Vancouver Island. At the MASS site, situated on MacMillan Bloedel private lands, more than 15 research studies are examining various aspects of the ecology and management of mid to high elevation forests. Humble, in collaboration with Dr. Richard Ring and Neville Winchester of the University of Victoria (UVic), are examining the arthropod communities in the canopies of the two dominant tree species, amabilis fir and western hemlock, and their responses to silviculture systems.

Collecting samples in the forest canopy.

"The MASS site provides a unique opportunity to study the canopies; see what's really going on up there," says Humble. "We're making use of the MASS site, Forest Renewal B.C. funding, MacMillan Bloedel infrastructure and UVic's accessing technology and background research. It really links a great deal of research ideas and technologies, so we can work together."

Collecting the branch and lichen samples is a formidable task. Samples are retrieved from the tree tops using a combination of rock and mountain climbing techniques developed at UVic. Researchers climb up into the canopy via a simple rope system, to heights of up to 130 feet. More than 240 branch and lichen samples are collected this way every month. They are brought to PFC's Insectary, sorted, processed and identified by staff. This quantitative sampling is supplemented by the collection of more than 360 individual trap samples per month.

It is perhaps in the identification process where the real mystery lies. Preliminary examinations of canopy branch samples have revealed the presence of two undescribed species of Cecidomyiidae (gall midges) on shoots of amabilis fir, and one in cones of western hemlock. The presence of large populations of both hemlock and balsam woolly adelgids within the old-growth canopy was also a bit of a surprise.

"So much is unknown. That's why we need to obtain a comprehensive overview of the arthropods associated with the forest canopy," says Humble. PFC is therefore working towards expanding the current reference collection with these and other samples collected at research projects taking place across B.C. Access to accurately identified specimens makes future identifications more efficient and effective, to better serve research taking place all over Canada and the world.

PFC's canopy studies form a key part of the efforts of the CFS' Forest Biodiversity Network (FBN), one of ten national research networks targeting specific forest issues. Understanding the impacts of forest management and other human and environmental pressures on forest biodiversity is one of the FBN's goals. Another is building strategic partnerships with other government departments, industry, and academia, which will better enable forest scientists to uncover and tackle

Continued on page 12

Canada's Forest Ethic: Incorporating Ethical Structures into Decision Support Systems

"This study will provide the biological and ecological foundation for a more holistic approach to forest management."

As social and environmental values compete for influence in the resource sector, Canada's forest ethic is coming under considerable public scrutiny from inside and outside the country. That is putting new demands on forest producers to demonstrate ecological management by considering environmental ethics in their forest practices.

"Society's view of the forest has changed," said Dr. Alan Thomson, research scientist at the Canadian Forest Service, Landscape Management Network. An expert in Decision Support Systems (DSS), Thomson develops artificial intelligence (AI) systems at the Pacific Forestry Centre that help forest stakeholders manage Canada's forests by forecasting the effects of management decisions.

"A lot of my work in DSS has been at the landscape level," Thomson said, speaking at the Landscape Management Network conference held on Vancouver Island in September. He is now working to incorporate ethical structures into those DSS. "Environmental issues raise a host of difficult ethical questions," explained Thomson, "and ethics, as a system of values or principles, comprises many issues fundamental to practical decision making. Right now (the forest ethic) is moving toward a deep ecology ethic where you are trying to make your practices fit in with the way the environment works, taking into account multiple values of which human values are one set."

That is a major shift from only 25 years ago when forestry meant, almost solely, the exploitation of a resource. "As you start to take a wider view of who is a forest user, you have to start to think of non-timber values," Thomson said.

That shift has led to conflict between the now competing values. Resolving such conflict is the core of applied ethics — understanding the nature of the biases and distortions that affect decision making, thereby clarifying the conditions in which consensus can at least be approximated.

"I feel there are two parts to the role of ethics in forestry. The first part is in the decision sets themselves: 'what do I do under a particular set of circumstances?' The other part is the process that is involved in making the decisions, because even if you come up with the right decision, if the process is not perceived to be a fair one it might not be deemed acceptable."

Dr. Alan Thompson

But even if the research into ethics does not generate an AI-based decision support system to help make all the right choices, the research itself may prove invaluable. "Through the exercise of looking at what the issues are and what the tools might be, one can take the concepts and apply them in the decision making process to make sure the process itself is ethical," Thomson says.

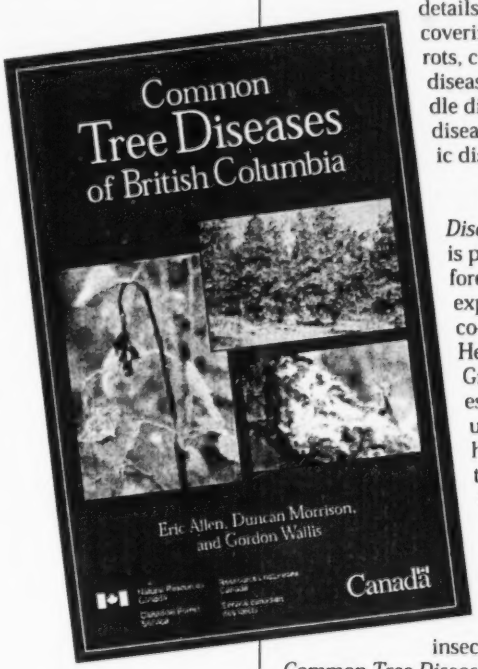
And in doing that, he suggests, Canada's forests will be better managed with fewer conflicts.

Dr. Thomson can be reached at athomson@pfc.forestry.ca.

Common Tree Diseases of British Columbia

Decay, fungus, rot – not words you want associated with a tree whether it's in a forest renewal site or your backyard. But how do you know what the disease is and how to treat it? You get out the new book, *Common Tree Diseases of British Columbia* by Eric Allen, Duncan Morrison and Gordon Wallis.

The Canadian Forest Service (CFS) has just released the 176-page book with color illustrations describing tree diseases found throughout the province. *Common Tree Diseases of British Columbia* details over 100 tree diseases, covering root diseases, heart rots, conifer rust fungi, canker diseases, sap rots, conifer needle diseases, broadleaf foliar diseases, mistletoes and abiotic diseases.



"Although *Common Tree Diseases of British Columbia* is primarily aimed at forestry professionals," explained Dr. Eric Allen, co-author of the book and Head of the Forest Health Group of the Canadian Forest Service, "it will also be useful to arborists and horticulturists as a guide to diagnosing disease on a wide variety of plants."

The book details forest diseases that are injurious conditions not caused by fire or insects. Diseases described in *Common Tree Diseases of British Columbia* are often apparent by abnormal or reduced tree growth, and can lower wood quality, predispose the tree to attack, or ultimately cause the death of trees. Symptoms include loss of tree health or abnormal development of a tree or its parts (e.g. unnatural colour changes, swellings, dwarfing, or wilting).

"Besides those disease signs and symptoms that can be detected by the naked eye," explains Allen, "*Common Tree Diseases of British Columbia* lists microscopic characteristics of the fungal fruiting bodies, spores, and fungal growth in culture."

The infectious diseases described in *Common Tree Diseases of British Columbia* are caused by living agents such as fungi, and higher plants which attack trees to obtain nutrients essential to their development. Non-infectious or physiological diseases are caused by non-living agents which disturb the normal development of a tree (e.g. pollution, unusually high or low temperatures, excess or deficiency of water or nutrients).

Common Tree Diseases of British Columbia is organized according to type of disease (e.g. rusts, cankers, mistletoes) or the part of the tree that is affected (e.g. heart rots, root diseases). They are listed by their common name, as recognized by the 1984 Western International Forest Disease Work Conference. The latin name of the disease-causing agent is also identified, as well as the name by which the organism was previously known. Following the disease descriptions, common and latin names of host plants are listed.

A clear and concise index is essential to all identification guides, and *Common Tree Diseases of British Columbia* has three indices. The first index lists disease-causing organisms by host and affected plant part. The second index includes disease organisms grouped by distinctive signs or symptoms; invaluable to determining the causal agent when a sign or symptom is detected. The third index lists all diseases and disease-causing organisms by common name, genus, species, and where appropriate, previously used latin names.

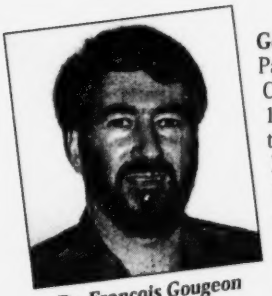
Information regarding disease distribution was obtained from CFS Forest Insect and Disease Survey collection records or through personal communication with regional experts.

This book is the third CFS edition of a tree disease identification guide for British Columbia. The first was published in 1949 by J.E. Bier, and a 1969 version was written by R.E. Foster and G.W. Wallis, and reprinted in 1974.

Partial funding was obtained from Forest Renewal British Columbia (FRBC) and the Canada-British Columbia Partnership Agreement on Forest Resource Development (FRDA II).

More information about *Common Tree Diseases of British Columbia* is available at eallen@pfc.forestry.ca.

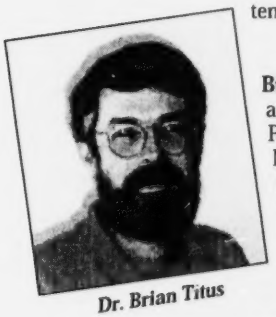
Staff Comings and Goings



Dr. François Gougeon

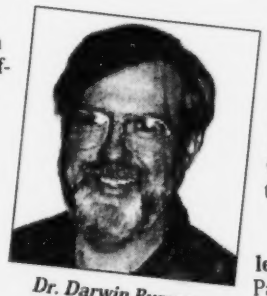
Dr. François Gougeon joined the Pacific Forestry Centre in July 1996, working in the Landscape Management Network. As a scientist with the Petawawa National Forestry Institute since 1979, François has been involved in digital remote sensing including computer image analysis and robotics research.

The Pacific Forestry Centre welcomes **Dr. Brian Titus,** research scientist from the Canadian Forest Service lab in Newfoundland. Brian will continue his research in nutrient cycling, decomposition and humus processes while working in the Forest Ecosystem Network.



Dr. Brian Titus

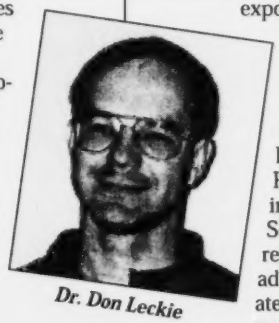
Dr. Darwin Burgess has arrived from the Petawawa National Forestry Institute where he initiated studies to increase the understanding of forest ecosystem processes and alternative silvicultural techniques. Darwin will continue his work as research silviculturalist at the Pacific Forestry Centre in the Effects of Forestry Practices Network.



Dr. Darwin Burgess

Dr. Don Leckie is a research scientist in the Landscape Management Network who joined the Pacific Forestry Centre in August of this year. Don was the project leader of Digital Remote Sensing at the Petawawa National Forestry Institute.

Dr. Robert Dobbs is retiring after 30 years with the Canadian Forest Service. He began his career as a research scientist in Winnipeg and joined the Pacific Forestry Centre in 1970. Bob left in 1977 to assume management duties at headquarters within the ENFOR Biomass Production Contract Research Program and returned to the Pacific Forestry Centre in 1984 as Director of Research Programs.



Dr. Don Leckie

Dr. Charles Dorworth, research pathologist, is retiring from the Pacific Forestry Centre this December. Charles has worked with the Canadian Forest Service for 29 years and is respected internationally for his studies in biocontrol. Charles was the first to use immunochemistry to delimit races of plant pathogenic fungi, and these techniques led to the development of Canada's first forest tree quarantine.

Dr. Allan Van Sickle is retiring from the Pacific Forestry Centre after 31 years with the Canadian Forest Service. He has served as research scientist in entomology and pathology and has been Head of the Forest Insect and Disease Survey since 1979. Allan received the General Excellence Award for his contribution to reducing concerns among European trading partners about pinewood nematodes in Canadian wood exports.

Dr. Keith McClain, research manager of the Northern Centre for Applied Forest Management in Prince George, is leaving the Canadian Forest Service. While in the regional office, Keith addressed issues associated with high elevation regeneration options, mixed-wood silviculture, growth and yield, seedling physiology, stock production and site productivity.

Recent Publications

Common tree diseases of British Columbia. Allen, A ; Morrison, D.; and Wallis, G. (1996) 176 p.

Common insects damaging junipers, cedars and cypresses in British Columbia. Duncan, R.W. Forest Pest Leaflet 70. (1996) 8 p.

Satin moth in British Columbia. Humphreys, N. Forest Pest Leaflet 38. (1996) 8 p.

Forest tree seed certification in Canada under the OECD scheme and ISTA rules: summary report for 1991-1995. Portlock, F.T. Information Report BC-X-361. Canadian Forest Service, Pacific Forestry Centre, Victoria BC. (1996).

Canada's forest inventory 1991: the 1994 version. An addendum to Canada's forest inventory 1991. Lowe, J.J.; Power, K.; Gray, S.L. Information Report BC-X-362E. (1996).

Inventaire des forêts du Canada 1991 : Version 1994. (Un addenda L'inventaire des forêts du Canada 1991) Lowe, J.J.; Power, K.; Gray, S.L. Rapport d'information BC-X-362F. (1996).

Acrobat versions of the French and English versions of BC-X-362 are currently available for downloading from the Pacifc Forestry Centre world wide web site: www.pfc.forestry.ca.

Upcoming Events

Wildland Fire 97

An International Wildland Fire Conference and Trade Show

May 25 - 30, 1997
Vancouver, B.C., Canada

The 2nd International Wildland Fire Conference will focus on the social, economic, and environmental impact of wildland fire, with moderators and keynote speakers from Canada and around the world. It will include more than 600 international public and private agency delegates who will share information, discuss issues, and exchange programs and strategies within the theme of "Wildland Fire Management and Sustainable Development". The Conference will also feature FireInfo 97, a two-day information exhibit and poster session, and Worldfire 97, a global perspective on world wildland fire programs.

The Wildland Fire Conference is sponsored by the Canadian Forest Service together with the B.C. Ministry of Forests' Protection Program, the Canadian Interagency Forest Fire Centre, the National Wildfire Coordinating Group, and the International Wildfire Association of B.C.

For further information please contact:
Events by Design, 601-325 Howe Street, Vancouver, B.C., Canada, V6C 1Z7; tel: (604)669-7175; fax: (604) 669-7083; e-mail: 74117.273@compuserve.com.

"Forest Canopies" continued from page 8

some of the issues related to biodiversity.

"Everything we're learning through canopy studies will help form a baseline of information that will be invaluable to all aspects of maintaining forest health and biodiversity," says Humble. "We really are breaking new ground." This "new ground" just happens to be hundreds of feet up in the sky.

Dr. Humble can be reached at lhumble@pfc.forestry.ca.

"Seeing..." continued from page 2

Canada's commitment to sustainable development at home, coupled with establishing strong partnerships among forest nations, is a challenging responsibility. But as Dr. Winget said at the conference, "Future generations around the globe are counting on us to succeed. I am confident we will."

Abstracts of conference speeches are available at http://www.res.for.gov.bc.ca/conferences/sept96/agenda.html. Information about Canada's commitment to sustainable development is available through the Canadian Forest Service world wide web site: http://www.nrcan.gc.ca/cfs, or the Pacific Forestry Centre site: www.pfc.forestry.ca.

INFORMATION FORESTRY

Published by

Pacific Forestry Centre
Canadian Forest Service
Natural Resources Canada
506 West Burnside Road,
Victoria, B.C., V8Z 1M5
(250) 363-0600

Editor: Joanne Stone
Layout: Jennifer Adsett
Contributors:
Andrew van der Gugten
Joanne Stone
Carol Wong

Articles from this issue may be reprinted without permission. Contact Joanne Stone, Canadian Forest Service.

For further information:
Phone: (250) 363-0606
Fax: (250) 363-6006
Email: jstone@pfc.forestry.ca